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Applicant(s): Yasushi KOHNO et al.

Docket No.

TKA0028

Serial No.

09/837,020

Filing Date

April 18, 2001

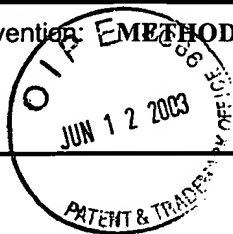
Examiner

Andrea Valenti

Group Art Unit

3643

Invention: **EMETHOD OF PREVENTING DEFECTIVE GERMINATION OR GROWTH OF PLANT**



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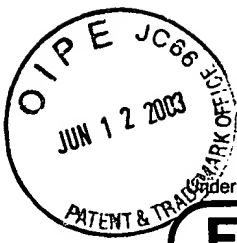
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FEE TRANSMITTAL for FY 2003

Effective 01/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) \$320.00

Complete if Known

Application Number	09/837,020
Filing Date	April 18, 2001
First Named Inventor	Yasushi KOHNO et al.
Examiner Name	Andrea Valenti
Group Art Unit	3643
Attorney Docket No.	TKA0028

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JUN 18 2003
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☒ Charge fee(s) indicated below ☒ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	750	2001	375	Utility filing fee	
1002	330	2002	165	Design filing	
1003	520	2003	260	Plant filing fee	
1004	750	2004	375	Reissue filing	
1005	160	2005	80	Provisional filing fee	
SUBTOTAL (1)					(\$)

2. EXTRA CLAIM FEES FOR UTILITY AND

Extra Claims Fee from below Fee Paid

Total Claims -20** = 0 X = 0.00

Independent Claims -3** = 0 X = 0.00

Multiple Dependent =

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	84	2201	42	Independent claims in excess of 3	
1203	280	2203	140	Multiple dependent claim, if not paid	
1204	84	2204	42	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	
SUBTOTAL (2)					(\$) \$0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non - English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	410	2252	205	Extension for reply within second month	
1253	930	2253	465	Extension for reply within third month	
1254	1,450	2254	725	Extension for reply within fourth month	
1255	1,970	2255	985	Extension for reply within fifth month	
1401	320	2401	160	Notice of Appeal	
1402	320	2402	160	Filing a brief in support of an appeal	320.00
1403	280	2403	140	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,300	2453	650	Petition to revive - unintentional	
1501	1,300	2501	650	Utility issue fee (or reissue)	
1502	470	2502	235	Design issue fee	
1503	630	2503	315	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR § 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Statement	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	750	2801	375	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
Other fee (specify)					

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) \$320.00

SUBMITTED BY

Name (Print/Type): Michael S. Gzybowski

Signature: *Michael S. Gzybowski*

Registration No. (Attorney/Agent): 32,816

Complete (if applicable)

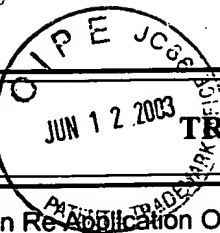
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TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.
TKA0028

In Re Application Of: **Yasushi KOHNO et al.**

#17

Serial No.
09/837,020

Filing Date
April 18, 2001

Examiner
Andrea Valenti

Group Art Unit
3643

Invention: **METHOD OF PREVENTING DEFECTIVE GERMINATION OR GROWTH OF PLANT**

TO THE COMMISSIONER FOR PATENTS:

Transmitted herewith in triplicate is the Appeal Brief in this application, with respect to the Notice of Appeal filed on April 7, 2003

The fee for filing this Appeal Brief is: **\$320.00**

- ☐ A check in the amount of the fee is enclosed.
- ☐ The Director has already been authorized to charge fees in this application to a Deposit Account.
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Signature

Dated: June 9, 2003

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Michael S. Gzybowski

Typed or Printed Name of Person Mailing Correspondence

CC:



#17

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Group
Art Unit: 3643

Attorney
Docket No.: TKA0028

Applicant: Yasushi KOHNO et al.

Invention: METHOD OF PREVENTING DEFECTIVE
GERMINATION OR GROWTH OF PLANT

Serial No: 09/837,020

Filed: April 18, 2001

Examiner: Andrea Valenti

Certificate Under 37 CFR 1.8(a)

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on June 9, 2003

Michael S. Gzybowski

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to Appellants' Notice of Appeal filed April 7, 2003 in connection with the above-identified application, appellants submit the present Brief on Appeal.

REAL PARTY IN INTEREST

Appellant has assigned this application to Agritecno Yazaki Co., Ltd. in an assignment which was executed by the inventors on April 6, 2001, and filed in the United States Patent and Trademark Office on April 18, 2001, and recorded on April 18, 2001 at Reel No. 011723 and Frame No. 0926.

06/13/2003 CNGUYEN 00000024 122136 09837020

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RELATED APPEALS AND INTERFERENCES

There are no related cases involved in any appeal procedures or Interferences.

STATUS OF CLAIMS

Claims 1-13 are pending in this application. Claims 1-13 stand under Final Rejection, from which rejection of claims 1-13 this appeal is taken. No other claims are pending.

STATUS OF AMENDMENTS

No Amendments After Final Rejection were filed in the application.

SUMMARY OF INVENTION

The present invention is directed to a method of preventing defective germination of plant seeds or growth of plants.

As set forth in the paragraph bridging pages 2 and 3 of appellants' specification, the method comprises the steps of: encapsulating one or more plant seeds in an aqueous gel capsule; refrigerating the encapsulated plant seed(s) under conditions in which the encapsulated seed(s) will not germinate; and sowing the plant seed(s).

Other embodiments of appellants' invention, as listed on page 3, lines 6-10 include: the size of the seeds is equal to or less than 1 mm; the refrigeration process is carried out in a dark place; the plant seeds are those of a light germinator; and the seed encapsulated in the aqueous gel capsule is a pelletized seed.

As discussed in the paragraph bridging pages 4 and 5 of appellants' specification, if the seeds are allowed to germinate during the refrigeration process, the germ or root that comes out of the gel capsule is likely to be damaged during subsequent handling and sowing.

Comparative test results which are provided in appellants' examples on pages 6-8 demonstrate the improvements in germination, bolting, efflorescence, rosette-formation, and cut flower length.

ISSUE

Whether claims 1-6 and 13 are unpatentable over Kohno et al. in view of Skarpaas under 35 U.S.C. §103(a).

Whether claims 7-12 are unpatentable over Kohno et al. "as applied to claim 1" and further in view of Asano 35 U.S.C. §103(a).

GROUPING OF CLAIMS

Claims 1-6 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kohno et al. in view of Skarpaas and therefore stand or fall together under this rejection.

Claims 7-12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kohno et al. "as applied to claim 1" and further in view of Asano and therefore stand or fall together separately from claims 1-6 and 13 under this rejection.

THE REFERENCES

The following references are relied upon by the examiner:

U.S. 5,701,700	Kohno et al.	Dec. 30, 1997
U.S. 5,525,131	Asano.	Jun. 11, 1996

Skarpaas, *Population Viability Analysis for the Oyster Plant (Mertensia maritime) in the Oslofjord Region* (1998)

BRIEF DESCRIPTION OF THE REFERENCES

Kohno et al. discloses a method of storing gel-coated seeds which seeds are encapsulated in an aqueous gel which is water-insolubilized by a metal ion. The encapsulated seed is stored in a storage solution that has an osmotic pressure which is varied by adding various salts thereto which are listed at column 3, lines 1-9. The storage solution is selected so as not to have an adverse influence on the compressive breaking strength of the gel coating.

At column 3, lines 51-54 Kohno et al. teach that the stored, gel-coated seeds exhibited an equal rate of germination and sticking out to gel-coated seeds which were not stored.

Asano discloses seeds that are coated with a clay mineral having a double chain structure which coagulates to a suitable degree of hardness in the presence of a hydrophobic compound. Suitable hydrophobic compounds are listed at column 3, lines 26-39.

Skarpaas is directed to a population viability analysis of a specific, herbaceous perennial plant (*Mertensia maritime* - "Oyster Plant") that is native to the beaches of southern Norway and drops "nutlets" into the ocean so that the nutlets float for a very long period of time (several months) in 3% salt water. The analysis focused on the manner in which the plant self-pollinates by autodeposition.

THE REJECTIONS

Claims 1-6 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al. in view of Skarpaas.

Under this rejection the examiner has relied upon Kohno et al. as teaching a method of encapsulating plant seeds in an aqueous gel capsule, followed by refrigerating the encapsulated seeds and thereafter sowing the seeds.

Skarpaas has been relied upon as teaching that a cold period is necessary to break seed dormancy and that prolonged cold treatment enhances germination.

In combining the teachings of Kohno et al. and Skarpaas, the examiner takes the position that:

...it would have been obvious....to modify the storage duration through routine tests and experimentation to a length that enhances germination as taught by Skarpaas.”

7-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kohno et al. “as applied to claim 1” and further in view of Asano.

Under this rejection the examiner has relied upon Asano as teaching that it is old and well known in the art of plant husbandry to pelletize a seed.

In combining the teachings of Kohno et al. and Asano, the examiner has taken the position that:

It would have been obvious to....apply the gel coating of Kohno et al to the pelletized seed of Asano for the mechanized and economical distribution of the seeds in the field.

ARGUMENT

It is noted in the Advisory Action of April 11, 2003 that the examiner stated:

Examiner maintains that the broad nature of applicant’s claim limitations does not patentably distinguish it over the teachings of the cited prior art.

For the reasons set forth below, appellants submit that prior art references relied upon by the examiner are not properly combinable under 35 U.S.C. §103.

Accordingly, the examiner’s basis for maintaining the final rejections of the claims, i.e. that the broad nature of appellant’s claim limitations does not patentably distinguish it over the teachings of the cited prior art, is not germane. The claimed invention is patentably distinguishable over the prior art of record.

The examiner has relied upon Kohno et al. as teaching a method of encapsulating plant seeds in an aqueous gel capsule, followed by refrigerating the encapsulated seeds and thereafter sowing the seeds.

Skarpaas has been relied upon as teaching that a cold period is necessary to break seed dormancy and that prolonged cold treatment enhances germination.

In combining the teachings of Kohno et al. and Skarpaas, the examiner takes the position that:

...it would have been obvious....to modify the storage duration through routine tests and experimentation to a length that enhances germination as taught by Skarpaas.”

Kohno et al. is only interested in storing gel-coated seeds in a manner that does not adversely affect the yield and handling properties of gel-coated seeds.

It is important to note that a particular problem addressed and solved by Kohno et al. was that if gel-coated seeds were stored under the same general conditions used for non-coated seeds, the gel coating loses water and becomes hardened. As a result, it becomes difficult for a bud or root sprouted from the seed to pierce through the coating. (Column 1, lines 25-32).

Kohno et al. utilizes an aqueous gel coating composition that is rendered water-insoluble by metal ions. In order to ensure that the storage solution does not adversely affect the gel coating, the storage solution is provided with an osmotic pressure by adding salts listed at column 3, lines 1-9 therein.

In confirming that the storage solutions does not adversely effect the yield of the gel-coated seeds, Kohno et al. conducted comparative tests and concluded that:

The gel-coated seeds thus stored exhibit equal rate of germination and rate of sticking out to those of the gel-coated seeds immediately after preparation. (Column 3, lines 51-54).

The fact the Kohno et al. conducted comparative tests and concluded that the gel-coated seeds that were stored exhibited a rate of germination that was “equal” to that of non-stored seeds establishes that the process of Kohno et al. does not inherently improve germination of the gel-coated seeds.

Moreover, the fact that Kohno et al. conducted comparative tests and concluded that the germination rates of stored and non-stored seeds was “equal” is evidence that appellants’ invention is unexpected over the teachings of Kohno et al. and therefore clearly unobvious.

The examiner has conceded that “Kohno et al does not explicitly state that the method prevents defective germination or growth of a plant” and has accordingly relied upon Skarpaas as teaching that a cold period is necessary to break seed dormancy and that prolonged cold treatment enhances germination.

Skarpaas is directed to a study of a specific, herbaceous perennial plant (*Mertensia maritime* “oyster plant”) that drops “nutlets” into the ocean so that the nutlets float for a very long period of time (several months) in 3% salt water. According to a standard dictionary definition (See www.webster.com) a “nutlet” is: “1 a : a small nut b : a small fruit similar to a nut” A “nut” is “1 a (1) : a hard-shelled dry fruit or seed with a separable rind or shell and interior kernel.”

Skarpaas is specifically interested in studying the manner in which the oyster plant reproduces and disperses.

In the working examples, Kohno et al teaches the use of radish seeds.

It is submitted that Kohno et al.'s radish seed is not at all comparable to the nutlet of Skarpaas or to any nut or nutlet since radish seeds do not have hard shells and separable interior kernels.

There is no nexus between the radish seed of Kohno et al. and the nutlet of Skarpaas which supports the examiner's assumption that the effect of allowing nutlets to float for very long periods of time (several months) in the ocean (3% salt water) would be the same if applied to radish seeds.

The only connection that has lead the examiner to consider combining the diverse teachings of Kohno et al. and Skarpaas is appellants' own disclosure. Absent such improper hindsight, one skilled in the art would never consider applying the teachings of Skarpaas to Kohno et al.

Certainly the hard, and relatively thick, shells of nuts and nutlets of plants which are native to the beaches of southern Norway are more resistance to that environment than the radish seeds of Kohno et al., so that it cannot be merely assumed that each would be affected in a similar manner. There is simply no basis within the teachings of these references that supports such an assumption.

While it is true that any determination of obviousness involves aspects of hindsight inasmuch as one must always compare the claimed invention and its solution with the most relevant prior art before the assessment of the "inventive step" in order to objectively determine the problem to be solved by the claimed invention, it is impressible to rely upon hindsight to reconstruct an appellant's claimed invention by combining teachings from prior art references, which prior art references themselves do not provide any motivation or suggestion for the combination.

That is, it is impressible to rely upon an appellant's own disclosure as a blueprint to reconstruct an appellant's claimed invention from isolated teachings found in the prior art.

Obviousness has to be based upon what the prior art references themselves teach or suggest, absent any reliance at all upon an appellant's disclosure.

An examiner cannot rely upon the benefit of hindsight as a substitute for some motivation or suggestion found within the teachings of the prior art that supports the obviousness of their combination.

In light of the above, it is urged that the teachings of Skarpaas are not at all related to the teachings Kohno et al., because radish seeds are not comparable to the nutlet of Skarpaas or any nut or nutlet since radish seeds do not have hard shells and separable interior kernels.

Furthermore, one would not consider or envision having radish seeds float for very long periods of time (several months) in the ocean (3% salt water) off southern Norway upon reading the teachings of Skarpaas, much less expect any beneficial results to be achieved thereby.

Kohno et al. teaches that the storage treatment discussed at beginning at column 3, line 28, *et seq.* produce seeds that have a germination rate that is "equal" to the germination rate of seeds that are not stored. (See column 3, lines 51-54) This echoes the statement at column 2, lines 53-56 that there is substantially no change in the properties of the seeds.

In actuality it is submitted that Kohno et al. fails to teach any benefit in germination caused by the storage process, even though Kohno et al. conducted comparative tests to determine effect on germination.

While Skarpaas teaches that a cold period is needed to break dormancy, the teachings of Skarpaas are limited to the oyster plant (*Mertensia maritime*).

For the reasons set forth above, the teaching of Skarpaas are not germane to Kohno et al.

The examiner's further reliance upon Asano does not address or overcome the deficiencies noted above related to the teachings of Skarpaas and Kohno et al.

Asano has been relied upon by the examiner as teaching that it is well known to pelletize a seed.

The examiner takes the position that it would have been obvious to apply the gel coating of Kohno et al. to the pelletized seed of Asano for "the mechanized and economical distribution of the seeds in the field."

Contrary to the examiner's position of obviousness, appellants note that it is very difficult to carry out a refrigeration treatment for a pelletized seed prior to sowing, because pelletized seeds formed with clay materials per Asano would tend to dissolve during the preservation in the cooling solutions of Kohno et al.

On page 4, of the Final Official Action the examiner states that:

Examiner disagrees with applicant's argument that the pelletized seed would dissolve during preservation, since Asano teaches exposure to ambient conditions and ambient conditions fluctuate between hot and cold and thus exposing the seed to cold temperatures without any adverse effects.

Appellants note it is not the heat and cold of Asano that would dissolve the seed coating material, but soaking coated seeds as taught by Asano in the liquid baths of Kohno et al.

On page 5 of the Final Official Action the examiner cites *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971) as holding that as long as an examiner's conclusion of obviousness "takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the appellant's disclosure, such a reconstruction is proper."

In re McLaughlin involved a rejection under 35 U.S.C. §103 of a claim directed to railroad box car having an arrangement of filling panels that allowed a car to be loaded and unloaded simultaneously from both sides.

The court of appeals found primary reference to Cook indicated that the car shown therein is suitable for carrying palletized loads with lift trucks being used for the loading and unloading, including the stacking of the pallets. The secondary references show that it was well known to use side filler panels and bulkheads to confine palletized loads to prevent lateral and longitudinal shifting.

It is important to note that in *In re McLaughlin* each of the prior art references directed to railroad car structures which the court of appeals found were properly combinable in the examiner's rejection.

In the present situation, the teachings of Skarpaas and Kohno et al. are not related as was the prior art in *In re McLaughlin*. Skarpaas involves oyster plant "nutlets" that are allowed to float in the ocean off southern Norway for several months. Skarpaas teaches that this process breaks the dormancy of the nutlets.

Kohno et al. is directed to a process for storing gel-coated radish seeds that are placed in a storage solution for a limited number of days. Kohno et al. report that the storage-treated seeds exhibit a germination rate that is equal to non-stored seeds.

These differences negate the ability of the examiner to properly rely upon the holding in *In re McLaughlin*. The knowledge that gel-coated radish seeds could benefit from being stored in a cold liquid solution is not found in Skarpaas or Kohno et al. alone or in combination.

Absent this knowledge being found in the prior art, it can only be concluded that appellants' own disclosure has suggested the combination. This follows the holding in *In re McLaughlin* which supports appellants' position that the prior art as been improperly combined and the outstanding rejection of the claims should accordingly be withdrawn.

The examiner's position that "applicant's extremely broad claim language does not distinguish it over the teachings of the prior art," does not compensate for the fact that the prior art relied upon by the examiner is not properly combinable and does not suggest or otherwise render obvious appellants' claimed invention.

Appellants note that there is a discrepancy between applying prior art based upon a broad interpretation of an appellants' claimed invention and improperly combining prior art references.

Even if an appellants' claims are broad, an examiner is still not permitted to establish obviousness on a combination of prior art teachings that the prior art that lacks a suggestion or motivation in the prior art, i.e. is not truly obvious.

The argument set forth herein by appellants is not whether or not the pending claims are broad. The argument is that the prior art is not properly combinable. The position set forth by appellants is that the teachings of the prior art, absent improper hindsight and reliance upon appellants' own disclosure, do not provide the request motivation or suggestion needed to establish obviousness.

Skarpaas' teachings of oyster plant seeds ("nutlets") floating in the ocean off southern Norway for months and breaking the dormancy of the seeds is not germane to Kohno et al. who teach that cold storing radish seeds does not effect or change the germination of the seeds over non-stored seeds.

The rejections of the claims are believed to be improper under 35 U.S.C. §103.

Appellants' invention is not inherently taught by Kohno et al., because Kohno et al.'s comparative tests of germination rate concluded that the germination rates of stored and non-stored seeds were "equal."

Appellants' invention is not obvious over the combination of Kohno et al. and Skarpaas, because the teachings of these references are not properly combinable for the reasons set forth above.

Accordingly, the rejections of the claims are believed to be improper and should be reversed.

CONCLUSION

For the reasons advanced above, appellants respectfully contend that the rejection of claims 1-6 and 13 as being obvious under 35 U.S.C. §103(a) over Kohno et al. in view of Skarpaas is improper because the examiner has not met the burden of establishing a *prima facie* case of obviousness.


Moreover, for the reasons advanced above, appellants respectfully contend that the rejection of claims 7-12 as being obvious under 35 U.S.C. §103(a) over Kohno et al. "as applied to claims 1, in view of Asano is improper because the examiner has not met the burden of establishing a *prima facie* case of obviousness.

Reversal of each of the rejections on appeal is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,



Michael S. Gzybowski
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CLAIMS ON APPEAL

1. A method of preventing defective germination or growth of a plant comprising the steps of:

encapsulating one plant seed of a plurality of plant seeds in an aqueous gel capsule;
refrigerating the plant seeds under the condition that the plant seeds do not germinate; and
sowing the plant seeds.

2. The method of preventing defective germination or growth of a plant according to claim 1, wherein the size of the plant seed is equal to or less than 1 mm.

3. The method of preventing defective germination or growth of a plant according to claim 1, wherein the refrigeration is carried out in a dark place.

4. The method of preventing defective germination or growth of a plant according to claim 2, wherein the refrigeration is carried out in a dark place.

5. (Amended) The method of preventing defective germination or growth of a plant according to claim 3, wherein the plant seed is a seed of a light germinator.

6. The method of preventing defective germination or growth of a plant according to claim 4, wherein the plant seed is a seed of a light germinator.

7. (Amended) The method of preventing defective germination or growth of a plant as claimed in claim 1, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

8. The method of preventing defective germination or growth of a plant as claimed in claim 2, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

9. The method of preventing defective germination or growth of a plant as claimed in claim 3, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

10. The method of preventing defective germination or growth of a plant as claimed in claim 4, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

11. The method of preventing defective germination or growth of a plant as claimed in claim 5, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

12. The method of preventing defective germination or growth of a plant as claimed in claim 6, wherein the plant seed encapsulated in an aqueous gel capsule is a pelletized seed.

13. The method of preventing defective germination or growth of a plant according to claim 1, wherein the step of refrigerating the encapsulated plant seeds is conducted at a temperature of about 15°C or lower and for a sufficient period of time to improve the germination of the encapsulated plant seeds as compared to non-refrigerated encapsulated plant seeds.